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Instabilities in ion rich sheaths[1] J. MANUEL URRUTIA, Urrutia Scientific, REINER STENZEL, UCLA — Ion rich sheaths are observed to become unstable when the electron supply is restricted. This instability has been studied for a spherical grid immersed in an ambient discharge plasma. When biased negatively ions are attracted into the sphere while electrons are restricted and the inside sheath of the grid becomes unstable. The charge density, hence plasma potential, oscillates below but near the ion plasma. Electrons inside the sheath lower the frequency and create harmonics and subharmonics. When the mesh size becomes comparable to the Debye length the 3D sheath structure creates additional low frequency sheath oscillations which produce sidebands to the instability spectrum. Related instabilities are also seen when the electron supply is restricted by a magnetic field parallel to the sheath. Relevance and applications will be explained.

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